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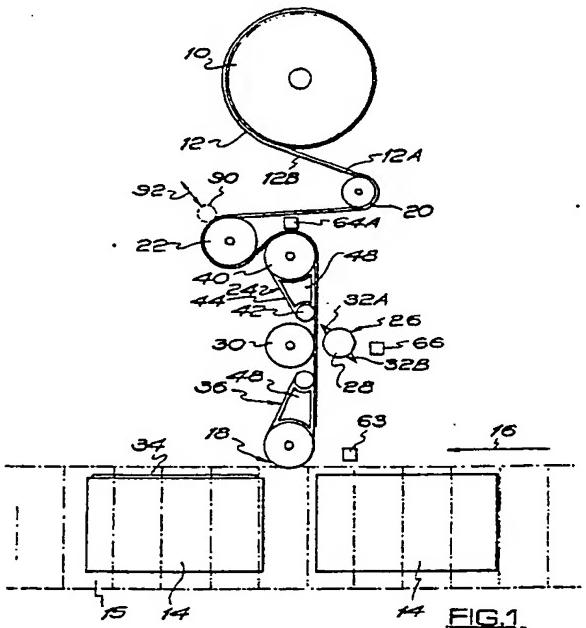
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(54) Improvements relating to the application of labels to articles.

(57) The invention relates to the application of labels especially primary labels to articles which are moved in sequence through an applicator. The labels are in the form of a continuous self adhesive web (12) which is fed step by step through the applicator and at each step a label is cut from the leading end of the web. As an article (14) is detected the label web (12) is stepped by the label pitching. The cutter (26) is actuated depending upon the label length and the offset between the label and an associated registration mark to ensure that the web is cut in the correct position. The web feed and cutter actuations are computer controlled and the machine can be programmed with cutter length and offset so that the machine can cut labels of any length (within the physical limits) without changing the machine parts. The invention also discloses a novel label web feeding arrangement.

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Improvements relating to the application of labels to articles

This invention relates to the application of labels to articles, and relates to apparatus and method for the application by adhesive of the individual labels to individual articles such as bottles, boxes, containers and the like which move sequentially past an application station.

The invention is concerned with the cutting of similar individual labels from a continuous web of such labels and mainly, although perhaps not exclusively, the web may comprise a web of base stock material to one side of which is provided a pressure sensitive adhesive by which the labels may be adhered to the articles. In alternative constructions, it may be possible to use heat or water activated adhesive or even adhesive which is activated by other means, or heat sealable labels, but as the main embodiments of the invention to be described concern the use of pressure sensitive adhesive and as the apparatus of these embodiments would require significant modification to enable adhesives of the type which must be activated to be used, reference is made mainly hereinafter to pressure sensitive adhesive labels; but the invention is not to be considered as being necessarily limited thereto.

The web of labels is arranged so that the individual labels are equally pitched thereon, and typically the web will be wound into roll form. There may either be an interleaved web of a release material to enable the pressure sensitive side of the roll of labels to unwind freely as the adhesive will more readily peel from the release web than the opposite side of the stock material, or in the alternative, the stock material may be provided on its opposite side with a release characteristic surface to enable said unrolling of the roll of labels to take place without difficulty.

Applicator machines for the application of individual self adhesive labels from a web of such labels to a line of moving articles is known, and one example of such applicator machinery is disclosed in European Patent No. 0081963.

In that application, the label web is fed continuously as are the articles, and a cutting drum and anvil co-operate to cut the labels individually from the web, and apply same to the articles. The labels, after being cut from the web, are held to the anvil by means of a vacuum until they reach the application station, when they are released and are applied to the articles.

In the known applicator machinery, the cutting drum is arranged to cut individual labels from the web and to leave a skeletal waste by which the label web is pulled through the machine. The applicator described in said European Patent is suit-

able for high speed application of labels to articles, but there has been identified that there is a market for applicator machinery operating at a slightly slower speed e.g. 100 labels per minute as opposed to 400 labels per minute, and the present invention is to some extent directed to that need. Additionally, in the known applicator, if the applicator is running, and one of the articles is missing, or several articles are missing, and do not arrive at the applicator station, then the continuous high speed running of the machinery results in considerable fouling by the unused labels or cost increasing controls have to be added to the machinery. Again, the present invention is such as to avoid these difficulties.

5 The apparatus according to the present invention at least in its preferred form can be or is arranged to operate on an "on-demand" basis (as opposed to operating continuously) insofar as labels will be applied only as long as there are articles in position to receive such labels.

10 Also in the apparatus of the present invention, the apparatus can be arranged either to cut individual labels from the web to leave a skeletal waste, referred to herein as "die cutting" or can be used to sever transversely of the web from edge to edge to cut the labels from the web, so that there is no skeletal waste, referred to herein as "butt cutting".

15 When the apparatus is used for butt cutting, it is preferably arranged so that the cutters of the apparatus can cut labels of different length without the necessity of having to change any of the parts of the apparatus, and in a particularly desirable arrangement, the machine can be programmed with information related to label dimension, so that the machine can be converted in minimum time from the cutting of labels of a first length to the cutting of labels of a second length, without the need for minute adjustment and the presence of skilled operators.

20 In accordance with the present invention, there is provided a method of applying labels to articles comprising the steps of:-

- 25 a) providing a continuous web of similar evenly pitched labels
- b) feeding articles to be labelled in sequence to an application station;
- c) detecting the presence of an article to be labelled;
- d) causing the web to be advanced by a label pitch and cutting of the leading label from the web; and
- e) either applying the said cut label to an article at the application station or applying a previously cut label to an article at the application

station whilst the said leading label is held in readiness for application to an article which subsequently arrives at the application station.

Preferably, the method includes causing the web to advance before the leading label is cut from the web.

Preferably also, the labels are cut from the web by means of a roller pair comprising a cutter roller and anvil roller which define a cutting nip through which the web is advanced.

According to a further preferred feature the method includes the step of controlling the timing between the commencement of feed of the web at each step and the driving of the cutter roller pair (or vice versa) depending upon the label length and the positioning (offset) of a registration means provided on the web for each label and the associated label.

Where the roller pair cuts labels from the web by butt cutting, it is preferred that in the rest position of the web, the leading end of the web is beyond the roller pair, and including the step of holding said leading end by a holding means in readiness for advancement at the next detection of the presence of an article to be labelled.

Preferably, the method further includes the step of holding a previously cut label by said holding means in addition to the holding of said leading end.

The web preferably has self adhesive on one side and a release characteristic on the other side so that it can be wound into roll form without a backing strip.

Also, according to the invention there is provided apparatus for cutting labels from a continuous web of evenly pitched labels and for applying the cut labels to articles comprising:-

- a) step by step web feeding means for advancing the web;
- b) cutting means for cutting the labels from the web;
- c) article detecting means for detecting the presence of an article to be labelled;
- d) application means for applying the cut labels to the articles when in an application station; and
- e) drive means connected between the detecting means, the web feeding means and the cutting means to cause, at each detection of an article to be labelled, advancement of the web by a label pitch, cutting of the leading label from the web and application of the said leading label or a previously cut label to an article at the application station.

Preferably, the drive means comprises two outputs, a first of which is connected to drive the web feeding means and a second of which is adapted to drive the cutting means.

The drive means may further include clutch means and clutch control means enabling the feeding means and cutting means to have different instants of actuation.

5 The apparatus may include setting means operatively connected to the clutch control means for varying the instant of actuation of the clutch in relation to the instant of actuation of the feeding means, and said setting means may be a manually operated keyboard.

10 Preferably, said setting means is adapted to receive settings of label length and offset, said offset being the distance by which a registration means of the web associated with each label is spaced from an end of the label, and including a registration sensor positioned to sense each registration means, said registration sensor coupled to the clutch control means to clutch in the cutting roller to cut the web, having regard to the label length and offset, at the correct location.

Suitably, the cutting means may comprise a cutter roller and an anvil roller defining a cutting nip through which the web is fed.

15 Preferably, the cutter roller is a butt cutting roller and when the cutter roller is in its rest position, the leading end of the web has passed through the nip, and is held by a holding means.

20 The holding means may be a vacuum holding means and may comprise parallel conveying belts supported by guide rollers and/or channels with a vacuum chamber between the guide rollers.

25 One of the said rollers may also form the application means and a bank of said reaches of said belts is arranged to hold said leading end in a flat plane.

30 The feeding means may be of similar construction to the holding means and the feeding means and holding means are arranged to opposite sides of the cutting means.

35 According to yet a further feature, there is provided a cutter roller sensor and means to stop the feeding means in a predetermined position after each cut said sensor means being operatively coupled to said feeding means.

40 According to a further preferred feature, the cutter roller also is a vacuum roller having ports to hold the cut leading end of the web to direct same through the nip defined by the cutter roller and the anvil, and said roller having the facility to enable air to be blown through said parts to direct the leading end on to the holding means. By this arrangement, the advantageous result that the leading end of the web is always under control is obtained.

45 It will be understood that the present invention has various aspects each of which constitutes a separate invention and provides various distinct advantages. Thus, the differential driving of the cutting means and the feeding means enables dif-

ferent lengths of label to be cut using the same cutting equipment, when a cutting roller is for butt cutting. In this connection, the use of a cutter which parks and is driven in accordance with label parameters can be used even where the web is continuously driven through the machine. If the cutting roller is for die cutting, then the cutting roller has to be changed for labels of different configuration. A further advantageous feature resides in that when the leading end of the web passes through the nip, it is engaged by a holding means so that it is never free, and therefore the apparatus can be run confidently at substantial speeds. The cutter waits in a "parked" position, ready to cut the web whilst the leading end is so held, and that constitutes a new approach in the cutting of labels from a continuous label web.

A further novel and independent feature disclosed herein resides in that the cutter simultaneously is a vacuum holding means for the leading end of the web in the case of butt cutting, but in a further preferred arrangement, the cutting drum when provided for die cutting may also be a vacuum roller with ports therein in order to hold the individually cut labels on the cutter roller as they are either transferred directly to the article or to a transfer roller.

The holding means may be arranged to hold a cut label ready for application to an article so that when the signal is given to the feed means to feed and cut the web, the previously cut label is applied to the article and the label cut from the leading end of the web is passed to a holding position ready for arrival of the next article to be labelled.

The invention in its various aspects can best be described in relation to a specific embodiment of same, and in this connection reference is now made to the accompanying diagrammatic drawings, wherein:-

Fig. 1 is a plan of a labelling apparatus according to the invention;

Fig. 2 is a perspective view of the apparatus shown in Fig. 1;

Fig. 3 is an enlarged front view of the feeding mens shown in Fig. 1;

Fig. 4 is an enlarged sectional view taken on the line III-III in Fig. 3;

Fig. 5 is an enlarged sectional side view of the cutter roller of the apparatus shown in Fig. 1; and

Fig. 6 shows in portions A, B, C and D how the label web moves through the apparatus.

Referring to the drawings, a roll of similar labels arranged in web form is indicated by reference 10, and such rolls may typically comprise a web substrate on one side (the inside) of which is provided a pressure sensitive adhesive, and the other side of which exhibits a release characteristic,

such as may be provided by a coating of silicone material to enable the web to be wound into the roll form 10 without the use of a backing sheet. That is to say the adhesive side can be presented directly to the opposite side of the web and yet the web will unroll satisfactorily as indicated by reference 12 as the labels of the web are used up and specifically are applied to the articles 14 which are moved in sequence by conveyor 15 as indicated by arrow 16 past an applicator station or region 18.

The web 12 is rolled so that the adhesive side 12A is to the inside of the substrate whilst the release characteristic side 12B is to the outside. As the web 12 is unrolled it is fed over a guide roller 20 which may be a dancing roller in order to maintain the tension in the web 12, and then is directed over a feed roller 22. The roller 22 will, as it contacts the adhesive side of the web, require to be of a release characteristic material such as Teflon (trade mark).

From the roller 22, the web 12 is fed over a feeding means 24, and from the feeding apparatus the web passes to a cutting apparatus 26 comprising a butt cutting roller 28 and an anvil roller 30. The cutting roller 28 has two axial cutting blades 32A and 32B (although it could have one or more than two) which co-operate with the roller 30 in order to sever the web from side to side so as to release individual labels 34 to be applied to the articles 14. The cut labels are received and transported by a second apparatus 36 which is a holding and feeding apparatus and which is essentially similar to the apparatus 24 except that it is arranged symmetrically in relation to the apparatus 24 for a purpose to be described hereinafter.

The feed device 24 comprises a first and large roller 40 over which the web 12 is trained and a second and smaller roller 42 spaced from the first roller 40 but with its axis parallel thereto. A plurality of feed belts 44 pass between the respective rollers 40 and 42, which may be appropriately grooved for the purpose, so that the belts form a feed plane 46 (Fig. 4) along which the web 12 travels. It may be possible to use only one belt.

Between the rollers is a plenum chamber casing 48 which is hollow, as shown in Fig. 4 and the interior of same is vacated by the drawing of a vacuum through a vacuum coupling 50. Arrow 52 in Fig. 4 serves to indicate the withdrawal of the air from the interior of the casing 48.

The casing 48 in this example is of the shape shown in Fig. 1 so as to have curved ends which match the curvatures of the rollers 40 and 42, and a flat front face which lies in the plane 46, but which also has recesses 54 for receiving the belts 44. The belts are spaced so that sections 56 of the front face of the casing lie to opposite sides of the belts, and said sections 56 are provided with suc-

tion apertures 58 by which air is drawn into the interior of the plenum chamber 48. This ensures that the web 12 is held by suction in the plane 46 as the belts feed the web to the cutting apparatus 26.

The roller 40 may also be provided with a hollow interior to form a plenum chamber from which the air is withdrawn so that the web 12 will be held also by vacuum to the roller 40 and to the belts 44 which are trained around the roller 40. Roller 40 also strips the web 12 from roller 22 and prevents it from winding up on that roller.

There may be additional suction apertures adjacent or in the recesses 54 so that a vacuum is drawn along the edges of the belts 44 as they travel in plane 46.

The plane 46 lies tangential to each of the rollers 40 and 42 as shown, so that the web 12 will be fed smoothly and accurately into the nip between the rollers 26 and 28 of the cutting apparatus.

The feeding apparatus 36 is similar to the apparatus 24, but performs the additional function that the labels 34 are pressed by the roller 40 and the belts thereon to the articles 14. As the pressure sensitive surface of the labels 34 face and are applied to the articles 14, there is no difficulty in transferring the labels from the feeding apparatus 36 to said articles as the adhesion between the label and article will be greater than the suction, if any between the label and the roller 40, and in any case the suction applied by a roller 40 may be terminated in the region where the labels are first applied to the articles 14 by means of a suitable blanking plate located inside the roller 40 or the labels may be blown from the belts 44 by introducing an over pressure through the apertures where the roller faces articles 14.

The feeding device is a separate inventive concept and can be utilised in other applications.

Referring now more specifically to Fig. 2, which shows the apparatus of Fig. 1 in perspective elevation, Fig. 2 also shows the driving and control arrangements. The drive arrangement comprises a main drive motor 50 indicated diagrammatically as are the drive connection lines, these being indicated by dotted lines. The motor 50 has an output shaft 52 which drives two outputs 54 and 56 respectively coupled to clutches 58 and 60. The output from clutch 58 drives the rollers 40 of the feeding and holding assemblies 24 and 36, and also the feed roller 22 by virtue of the drive connection 62, whilst the output of clutch 60 drives via output shaft 64 the cutter roll 28 and the anvil roller 30.

The apparatus described has three sensing devices namely an article sensing device 63 which may be optical in nature e.g. a photo-cell, a label

registration mark sensing device 64A which again may be optical in nature, and a cutter roller sensing device 66 which may also be optical in nature. These sensing devices are coupled by control lines, indicated in double dotted lines to a microprocessor 68, and there is also an input device 70 in the form of a keyboard for programming the microprocessor 68.

The label web 12 is printed with similar and equally pitched labels, and each label is associated with a registration mark, the registration marks being equally pitched and at the same pitching as the labels along the length of the web. Sensor 64 looks for the registration marks. For any label web which is handled by the machine, the labels will be of a predetermined length but obviously the label length can vary from web to web, and furthermore the position of the registration mark may be such as to suit the label content; and therefore it will not always be offset in relation to the label ends by the same distance. For effective cutting, the apparatus therefore has to take account of label length and registration mark offset, and this is done by the microprocessor and input device coupled with the controls in the drives as provided for by the clutches 58 and 60.

Another control which can be set using the machine control system is the label/article offset, the purpose of which is to ensure that the leading edge of each label to be applied meets the article in the same position. This involves sensing, for example, the orientation or angular position of the article as it approaches the application station and advancing the label which is parked ready to be applied at the correct sequence in time, so that the leading end of the label meets the article at a particular location thereon. This setting is important where, for example, wrap-round labels are to be applied to seamed cylindrical containers to ensure that the leading and trailing edges of the label, when on the container, lie in a particular position in relation to the seam.

The apparatus thus far described operates as follows. When there is no article to be labelled, the machine is in a parked condition as shown in Fig. 2. It is to be noticed that in this condition the label web 12 has its leading end held by the holding device 36 in a particular position, as related to the label length. The rollers 28 and 30 are stationary as are the feed device 24 and drive roller 22. When an article arrives to be labelled and is sensed by sensor 63, this is signalled on line 72 to the microprocessor 68 which has been preprogrammed via the input device 70 to take account of the label length and the degree of offset between the label ends and the registration mark for each label. The first output from the microprocessor is on line 74 causing clutch 58 to engage. The engagement of

clutch 58 causes the rollers 22 and 40 to commence rotation and accordingly the label web 12 is advanced. With the advancement of the label web, sensor 64A eventually will pick up a registration mark (which may be on a subsequent label), and this information will be transferred via line 76 to the microprocessor 68. The microprocessor has been programmed with the label offset, and therefore will be able to output on line 80 a signal to cause clutch 62 to engage at the appropriate time to commence rotation of the roller 28 to ensure that the cutting blade 32A cuts the label web in exactly the correct position at the trailing edge of the label 34, and the neatly cut label 34 is therefore fed by the feeding and holding device 36 until it is applied to the article 40 as shown in Fig. 1. The feeding of the web 12 continues until the new leading edge of the web reaches the position shown in Fig. 2 when the feeding movement stops by disengagement of clutch 58. The cutter 28 continues to rotate until it has completed half a revolution as sensed by the sensing device 66 when the clutch 60 is cut out and the cutter reaches one of its two "park" positions. If the cutter is provided only with a single cutter blade, then it has to execute one complete revolution at each operation of the apparatus. The cutter could of course be provided with three or four blades if required and it would be made to execute the appropriate angular turning at each operation. The apparatus stops and awaits arrival of the next article to be labelled.

If reference is made to Fig. 5, it will be seen that the cutter drum 28 is also a vacuum drum in that it is hollow as shown at 82 and it has vacuum ports 84 and 86 immediately behind the cutter blades 32A and 32B having regard to the direction of rotation 86A of the cutter roller in use. The purpose of the ports 84 and 86 is to ensure that the cutter roller holds the leading end indicated in dotted lines in Fig. 5 by reference numeral 88 of the cut web 12 after cutting has taken place, and to advance that cut end through the nip between the cutter roller and anvil roller to a position at which air under pressure is blown through the parts such that the leading end is picked up by the holding device 36 and is advanced to the position shown in Fig. 2, when the apparatus stops. The cutter preferably co-operates with a lubricating means such as a lubricating roller in the manner described in European Patent Application No. 0220707.

The apparatus can be arranged to apply printed information to each label as it passes through the apparatus, and to this end a small print wheel is indicated by reference 90 in Fig. 1. The print wheel 90 may be adapted to be applied to and retracted from the web 12 as indicated by arrow 92 so that the print wheel is applied only when each label is in the correct position in order to receive

printed information in a particular location in the label.

If the apparatus is also to perform the said printing, it may be necessary to key into the microprocessor when the apparatus is being set up for any particular label, not only the offset between the registration mark and the end of the label, but also the offset between the registration mark and the position of the area of the label to receive the printing.

When a roll of labels is created, it is created in relation to the article to which it is to be applied, and the labels may carry certain information or may have certain requirements. Each label should have or be associated with an appropriate registration mark or hole so that it can be picked up by the sensor at location 64A, but the label might also have a space for a code number or a "consume by" date and the print wheel 90 imparts such information to the label. Obviously, it is necessary that the print should be applied accurately to the label, and also that the cutting should take place accurately so that the label web will be most effectively used. When labels of different pitch are applied, resetting of the machinery of Fig. 1 is necessary but in accordance with the preferred embodiment of the invention, this resetting of the machine is done as explained on a computer basis so that it is not necessary to change any parts of the machine. The computing is done through using encoders counting the number of turns made by one or other of the driven rollers when sensing takes place, and the effect can be best explained by referring now to Fig. 6 in conjunction with Fig. 1. With the machine set up as illustrated in Fig. 1, there are certain fixed path lengths. Thus, the distance which the label web travels between the application point of the print roller 92 and the location of sensor 64A is fixed and is designated in Fig. 6 by F1. Equally, the distance along the web path between the sensor position 64A and the cutting nip position designated by the distance F2 in Fig. 6, is fixed. Finally, the distance along the web path between the sensor 64A and the application station is a fixed distance. Because these distances are fixed in the machine, when labels of different length are used in the machine, by appropriate setting of the microprocessor, the machine can be made to operate to print in the correct location in the label, and also to cut the labels in the correct position as described herein. Fig. 6 shows a band of equal length labels 100 connected end to end to form the web 12. The leading end or free end is indicated by reference 102 and the sensor location 64A, the cut position by reference 104 and the position 106 of print roller 90 are also illustrated. In Fig. 6(A) the label web is shown in the park position i.e. it is stationary and awaiting

instruction to cut and apply a label to an article 14. Shown on each label is the registration mark 108 and a print box 110 in which the code information is to be printed by the print unit roller 90. The section of label web shown in Fig. 6 is shown as being straight, but it will of course lie in the path of travel of the web through the machine as shown in Fig. 1. The distances F1, F2 and F3 are therefore also shown. It is assumed in the park position that the sensor 64A is not in registration with a registration mark and that the cut position is not in registration with a cut line 112 and the print position 106 is not in registration with a print location 110. If now the machine receives an activation instruction as a result of a product 14 arriving at the sensor 63, or at some other appropriate position, the electronic controls will cause the clutch 58 to engage causing the web to move from the Fig. 6(A) position to the Fig. 6(B) position in which the sensor 64A now senses the arrival of the next registration mark 108. When this mark is sensed by previous preprogramming, the control system then knows exactly the distance D3, Fig. 6(B) which is the distance between the cut position and the end 112 of the leading or first label and by encoding counting, the cutting roller pair 28, 30 can be appropriately clutch engaged so that the cutter 28 will sever the label along the cut line 112 in actual fact as illustrated in Fig. 6(D).

Also, when the registration mark 108 has been sensed as illustrated in Fig. 6(B), the distance D2 between the print head 106 and the next code print area 110 to be printed will be accurately known, and the print roller 90 can be actuated accordingly to effect the printing at the appropriate instance to ensure that the printing will register in the print area 110.

When the label web reaches position Fig. 6(C), the printing of the label code area 110 of the last label 100 in Fig. 6 commences as calculated by the setting of the control system. Further, when the label web reaches position Fig. 6(D), the cutter 28 will in fact sever the first or leading label 100 along the cut line 112, detaching the label 100 from the web and allowing it to be accelerated away from the remainder of the web by the faster rotating assembly 36 and be completely applied to the article 14. The label web continues to be moved until the park position of Fig. 6(A) is again reached.

It is to be noted that in the park position as mentioned above the sensor 64A, the cut position 104 and the print position 106 are all offset in relation to the registration marks 108, the print code area 110 and the cut line 112. Therefore, labels of different length can be inserted with the registration marks 108 and the code areas 110 and cut lines 112 in varying positions but the equipment can still be made to function satisfactorily by

appropriate keying in of the label length and registration mark and code area offsets. Depending upon these offsets, and label length it may be that the apparatus is required to operate in that the cutter roller 28 commences rotation before the feeding means feeds the web 12, in which case the detection of the arrival of an article to be labelled would have the effect of causing the cutter roller 28 and the feed means to be actuated together or at different times without regard to the sensing of registration marks.

Claims

- 15 1. A method of applying labels to articles comprising the steps of:
 - a) providing a continuous web of similar evenly pitched labels;
 - b) feeding articles to be labelled in sequence to an application station;
 - c) detecting the presence of an article to be labelled;
 - d) causing, each time a label is to be applied to an article, the web to be advanced from a rest position by a label pitch and cutting of the leading label from the web; and
 - e) either applying the said cut label to an article at the application station or applying a previously cut label to an article at the application station whilst the said leading label is held in readiness for application to an article which subsequently arrives at the application station.
- 20 2. A method according to claim 1, including the step of causing the web to advance before the leading label is cut from the web.
- 25 3. A method according to claim 2, wherein the labels are cut from the web by means of a roller pair comprising a cutter roller and anvil roller which define a cutting nip through which the web is advanced.
- 30 4. A method according to claim 3, including the step of controlling the timing between the commencement of feed of the web at each step and the driving of the cutter roller pair (or vice versa) depending upon the label length and the positioning (offset) of a registration means provided on the web for each label and the associated label.
- 35 5. A method according to claim 3 or 4, wherein in the rest position of the web, the leading end of the web is beyond the roller pair, and including the step of holding said leading end by a holding means in readiness for advancement at the next detection of the presence of an article to be labelled.
- 40 6. A method according to claim 5, including the step of holding a previously cut label by said holding means in addition to holding said leading

end.

7. A method according to any one of the preceding claims, including the step of applying printed information to the same area of each label, as the web is advanced.

8. A method according to any preceding claim, including the step of providing that the web of labels comprises a web having pressure sensitive adhesive on one side thereof by which the labels are adhered to the articles.

9. A method according to claim 8, wherein the web is wound into roll form without a backing sheet.

10. Apparatus for cutting labels from a continuous web of evenly pitched labels and for applying the cut labels to articles comprising:

a) step by step web feeding means for advancing the web;

b) cutting means for cutting the labels from the web;

c) article detecting means for detecting the presence of an article to be labelled;

d) application means for applying the cut labels to the articles when in an application station; and

e) drive means connected between the detecting means, the web feeding means and the cutting means to cause, at each detection of an article to be labelled, advancement of the web by a label pitch, cutting of the leading label from the web and application of the said leading label to an article at the application station.

11. Apparatus according to claim 10, wherein the drive means comprises two outputs, a first of which is connected to drive the web feeding means and a second of which is adapted to drive the cutting means.

12. Apparatus according to claim 11, wherein the drive means further includes clutch means and clutch control means enabling the feeding means and cutting means to have different instants of actuation.

13. Apparatus according to claim 12 including setting means operatively connected to the clutch control means for varying the instant of actuation of the clutch in relation to the instant of actuation of the feeding means.

14. Apparatus according to claim 13, wherein said setting means comprises a manually operated keyboard.

15. Apparatus according to claim 13 or 14, wherein said setting means is adapted to receive settings of label length and offset, being the distance by which a registration means of the web associated with each label is spaced from an end of the label, and including a registration sensor positioned to sense each registration means, said registration sensor coupled to the clutch control

means to clutch in the cutting roller to cut the web, having regard to the label length and offset, at the correct location.

16. Apparatus according to any one of claims

5 10 to 15, wherein said cutting means comprises a cutter roller and an anvil roller defining a cutting nip through which the web is fed.

17. Apparatus according to claim 16, wherein when the cutter roller is in its rest position, the 10 leading end of the web has passed through the nip, and is held by a holding means.

18. Apparatus according to claim 17, wherein said cutter roller is a butt cutting roller.

19. Apparatus according to claim 17 or 18, 15 wherein said cutter roller also is a vacuum roller having ports to hold the cut leading end of the web to direct same through the nip.

20. Apparatus according to claim 17, 18, or 19, 20 wherein said holding means comprises a vacuum holding means.

21. Apparatus according to claim 20, wherein 25 said holding means comprises parallel conveying belts supported by guide rollers with a vacuum chamber between the guide rollers.

22. Apparatus according to claim 21 wherein 30 said rollers also forms the application means.

23. Apparatus according to claim 21 or 22, 35 wherein a bank of reaches of said belts is arranged to hold said leading end in a flat plane.

24. Apparatus according to claim 21, 22 or 23 40 wherein said feeding means is of similar construction to the holding means and the feeding means and the feeding means and holding means are arranged to opposite sides of the cutting means.

25. Apparatus according to any of claims 16 to 45 24, including a cutter roller sensor and means to stop the feeding means in a predetermined position after each cut said sensor means being operatively coupled to said feeding means.

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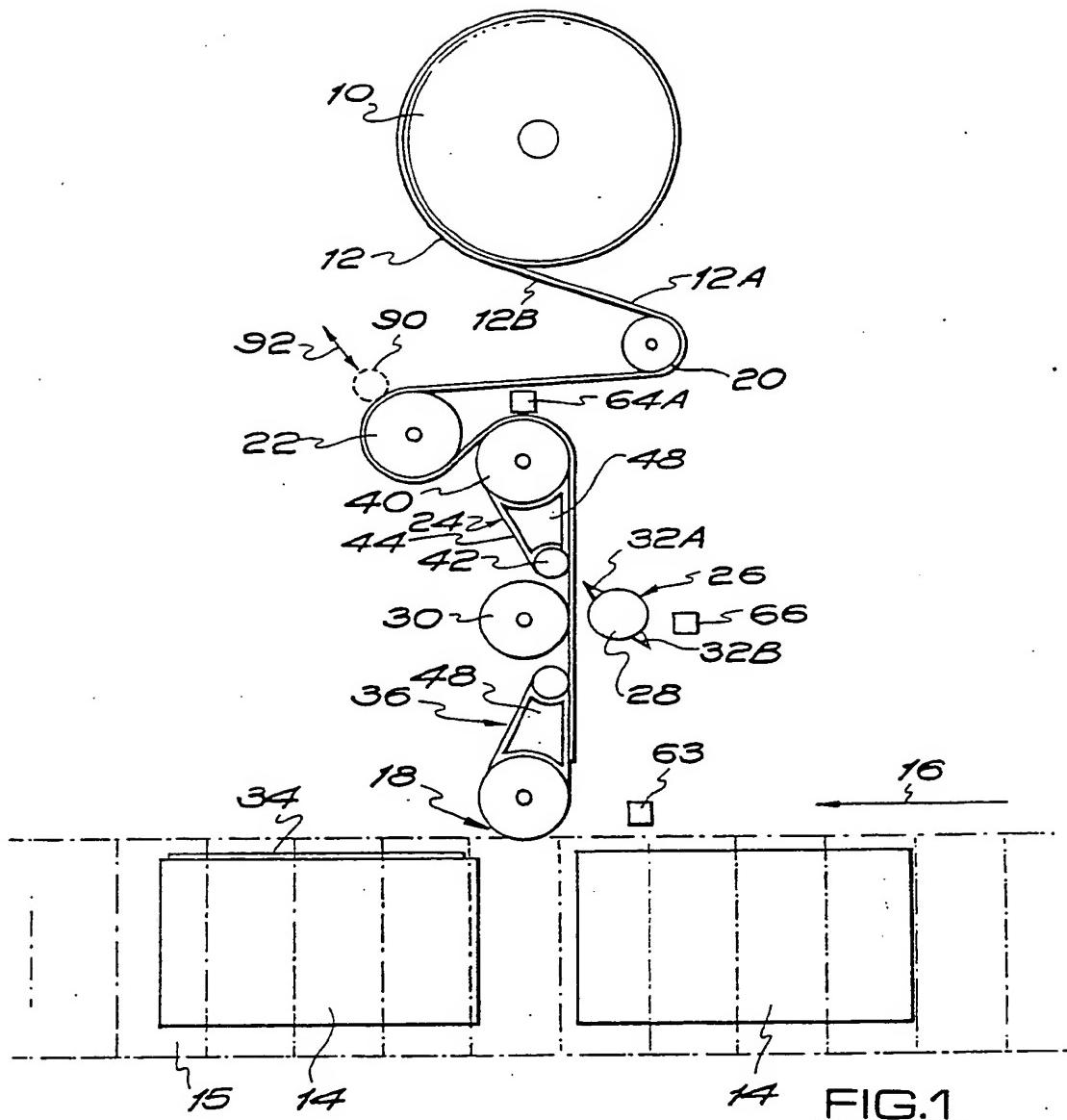


FIG.1

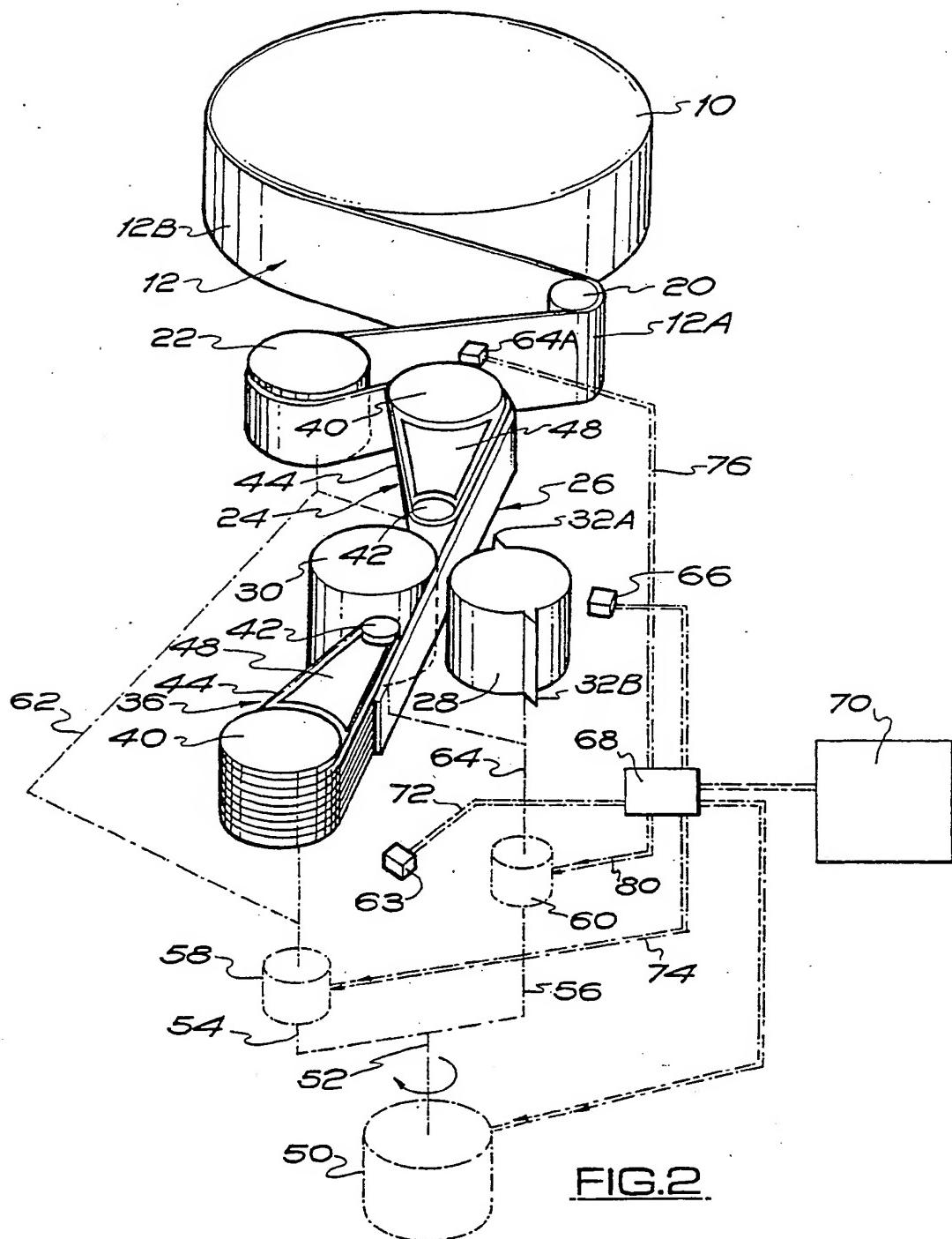
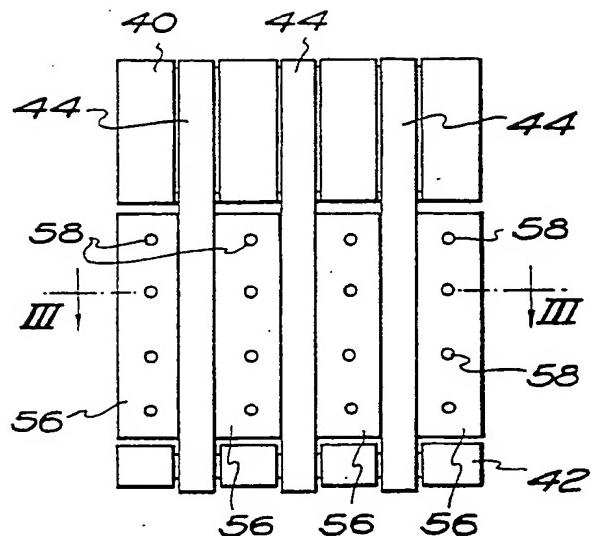
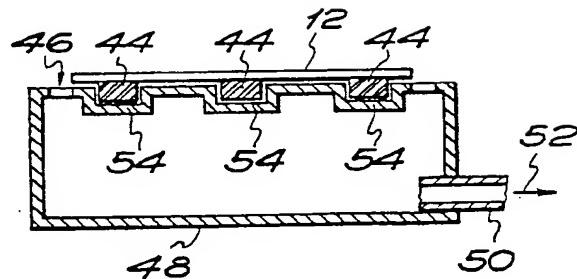
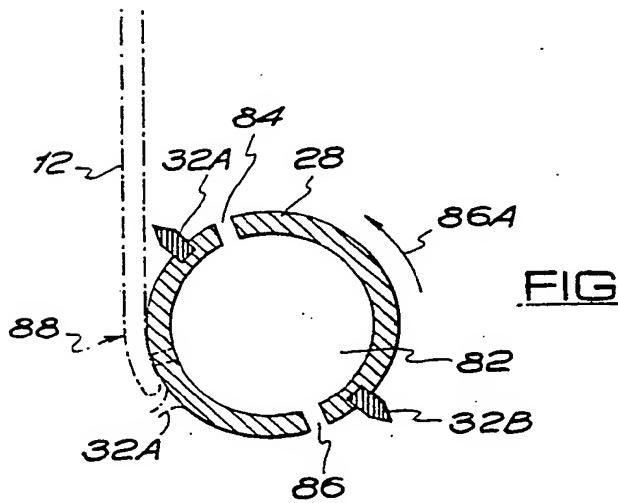


FIG.2.

FIG.3.FIG.4.FIG.5.

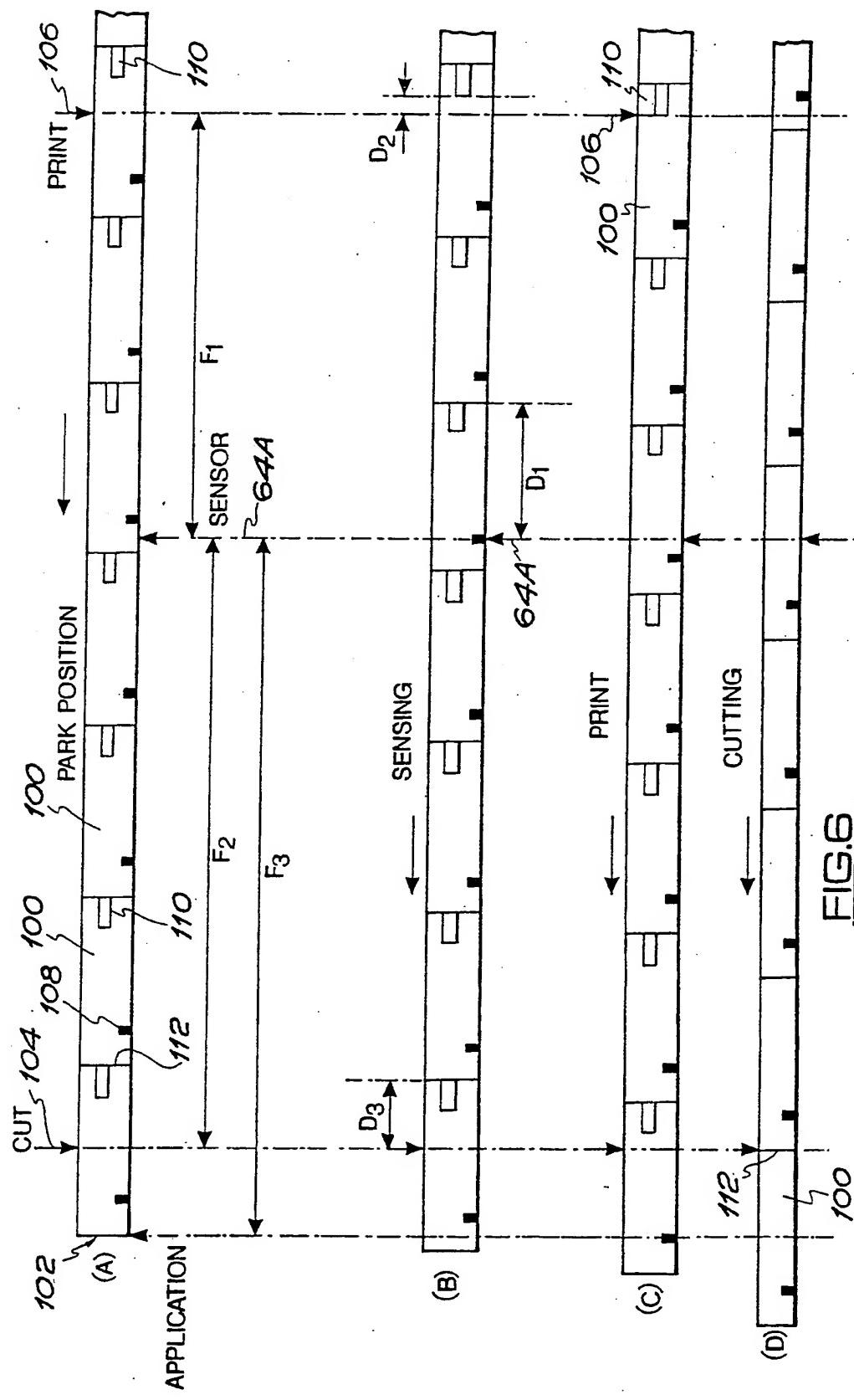


FIG.6.



European Patent
Office

EUROPEAN SEARCH REPORT

Application Number

EP 89 31 1230

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. Cl. 5)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
X	US-A-4 397 709 (A.F. SCHWENZER) * Column 4, lines 44-54; column 6, lines 53-58; column 2, lines 4-38; column 7, lines 30-36; figure 1 * ---	1,2,7,8 ,10,11	B 65 C 9/18 B 65 C 9/44
X	US-A-4 544 431 (G.W. KING) * Column 3, lines 4-16; column 4, lines 1-8; figure 1 *	1,4,10	
X	US-A-4 589 943 (KIMBALL et al.) * Column 11, line 41 - column 12, line 1; fig. 2-5 *	1,2,10, 11	
Y	---	3,16	
Y	DE-A-2 160 297 (KRONSEDER) * Pages 7,8; figure 1 *	3,16	
A	US-A-2 249 190 (J.J. THOMPSON) * Figures 2,4,6 *	11,12	
A	EP-A-0 109 266 (B. & H. MANUFACTURING CO.) * Page 6, line 26 - page 7, line 17; figures 1,2 *	13-15	TECHNICAL FIELDS SEARCHED (Int. Cl. 5)
A	DE-A-2 146 582 (A. FICHTE) * Whole document *	19	B 65 C B 65 B
The present search report has been drawn up for all claims			
Place of search	Date of completion of the search	Examiner	
THE HAGUE	30-01-1990	SCHELLE, J.	
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document			

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